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DIVISION 05 - METALS

SECTION 05500

MISCELLANEOUS METAL

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MISCELLANEOUS METAL

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36/A 36M	(2000) Carbon Structural Steel
ASTM A 48	(1994ael) Gray Iron Castings
ASTM A 53/A 53M	(1999b) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A 123/A 123M	(2000) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 320/A 320M	(2000) Alloy Steel Bolting Materials for Low Temperature Service
ASTM A 467/A 467M	(1998) Machine and Coil Chain
ASTM B 32	(1996) Solder Metal
ASTM B 221	(2000) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
ASTM B 221M	(2000) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric)
ASTM C 478	(1997) Precast Reinforced Concrete Manhole Sections
ASTM C 497	(1997) Concrete Pipe, Manhole Sections, or Tile
ASTM F 593	(1998) Stainless Steel Bolts, Hex Cap Screws, and Studs
ASTM F 594	(1998) Stainless Steel Nuts

ASME INTERNATIONAL (ASME)

ASME B16.3	(1998) Malleable Iron Threaded Fittings
ASME B18.2.1	(1996) Square and Hex Bolts and Screws (Inch Series)
ASME B18.2.2	(1987; R 1993) Square and Hex Nuts (Inch Series)

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1	(2000) Structural Welding Code - Steel

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

CID A-A-1923	(Rev A) Shield, Expansion (Lag, Machine and Externally Threaded Wedge Bolt Anchors)
CID A-A-60005	Frames, Covers, Gratings, Steps, Sump and Catch Basin, Manhole

DEPARTMENT OF PUBLIC WORKS, CLARK COUNTY, NEVADA (DPWCC)

DPWCC	UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA

STATE OF NEVADA DEPARTMENT OF TRANSPORTATION (NDOT)

NDOT	NEVADA DEPARTMENT OF TRANSPORTATION STANDARD PLANS FOR ROAD AND BRIDGE CONSTRUCTION

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The "RE" designates that the Resident Office will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Miscellaneous Metal Items; G, RE.

Detail drawings indicating material thickness, type, grade, and class; dimensions; and construction details. Drawings shall include catalog cuts, erection details, manufacturer's descriptive data and installation instructions, and templates. Detail drawings for the following items: trash rack structure, stilling well safety cage, stilling well access door, plates, and appurtenances, access gates, and staff gages.

1.3 GENERAL REQUIREMENTS

The Contractor shall verify all measurements and shall take all field measurements necessary before fabrication. Welding to or on structural steel shall be in accordance with AWS D1.1. Items specified to be galvanized, when practicable and not indicated otherwise, shall be hot-dip galvanized after fabrication. Galvanizing shall be in accordance with ASTM A 123/A 123M, as applicable. Exposed fastenings shall be compatible materials, shall generally match in color and finish, and shall harmonize with the material to which fastenings are applied. Materials and parts necessary to complete each item, even though such work is not definitely shown or specified, shall be included. Poor matching of holes for fasteners shall be cause for rejection. Thickness of metal and details of assembly and supports shall provide strength and stiffness. Joints exposed to the weather shall be formed to exclude water.

1.4 WORKMANSHIP

Miscellaneous metalwork shall be well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching shall produce clean true lines and surfaces. Welding shall be continuous along the entire area of contact except where tack welding is permitted. Exposed connections of work in place shall not be tack welded. Exposed welds shall be ground smooth. Exposed surfaces of work in place shall have a smooth finish, and unless otherwise approved, exposed riveting shall be flush. Where tight fits are required, joints shall be milled. Corner joints shall be coped or mitered, well formed, and in true alignment. Work shall be accurately set to established lines and elevations and securely fastened in place. Installation shall be in accordance with manufacturer's installation instructions and approved drawings, cuts, and details.

1.5 ANCHORAGE

Anchorage shall be provided where necessary for fastening miscellaneous metal items securely in place. Anchorage not otherwise specified or indicated shall include slotted inserts made to engage with the anchors, expansion shields, and power-driven fasteners when approved for concrete; toggle bolts and through bolts for masonry; machine and carriage bolts for steel; and lag bolts and screws for wood.

1.6 SHOP PAINTING

Surfaces of ferrous metal except galvanized surfaces, shall be cleaned and shop coated with the manufacturer's standard protective coating unless otherwise specified. Surfaces of items to be embedded in concrete shall not be painted. Items to be finish painted shall be prepared according to manufacturer's recommendations or as specified.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 General

Materials indicated on the drawings or required in the work and not covered elsewhere by detailed requirements shall conform to the requirements of this section. In all cases not specifically covered in these specifications, the Contractor shall furnish approved highest grade commercial materials or products which are suitable for the intended use of the item.

2.1.2 Structural Shapes and Plates

Steel bars, shapes and plates shall conform to ASTM A 36/A 36M. Galvanized coatings where required, shall conform to ASTM A 123/A 123M.

2.1.3 Wall Ladders Rungs (Galvanized)

Manhole steps shall conform to ASTM C 478 and ASTM C 497. Aluminum steps shall be solid made from material in conformance with ASTM B 221 (Alloy 6005-TS) and with ASTM B 221M. Reinforced plastic steps may only be used in manholes or other locations not exposed to sunlight and shall be polypropylene plastic coated 10 mm deformed steel rod pen ASTM A 36/A 36M. All steps shall be epoxied in place during the installation process.

2.1.4 Corrosion-Resisting Steel Bolts and Anchor Bolts

Corrosion-resisting steel bolts and anchor bolts shall conform to ASTM F 593, or the applicable requirements of ASTM A 320/A 320M, Grade B8.

2.1.5 Bolts

Bolts shall conform to ASME B18.2.1, or the applicable requirements of ASTM A 320/A 320M, Grade B8. The turned eye bolt shall have a 19 mm eye size, leg length of 100 mm and at least 3 mm thick.

2.1.6 Nuts

Nuts shall conform to ASME B18.2.2. Nuts shall be galvanized. Stainless Steel nuts shall conform to ASTM F 594

2.1.7 Expansion Anchors

Expansion anchors shall conform to the applicable requirements of CID A-A-1923. Anchors shall be multiple unit with inside thread.

2.1.8 Concrete, Mortar and Grout

Cast-In-Place Structural Concrete, mortar and grout shall conform to the requirements of Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE FOR CIVIL WORKS.

2.1.9 Steel Pipes

Steel pipe shall conform to ASTM A 53/A 53M, Type E or S, Grade A, galvanized nominal size and weight unless noted otherwise.

2.1.9.1 Pipe Access Gate and Appurtenances

Pipe access gate and appurtenances shall be fabricated as shown on the drawings. Pipe access gate and appurtenances (including nuts and washers) shall be galvanized.

2.1.10 Pipe Caps

Pipe caps shall conform to ASME B16.3.

2.1.11 Cover Plate

Cover plates shall conform to CID A-A-60005 or commercially available items meeting Contracting Officer approval. Sharp edges and burrs shall be removed from plates.

2.1.12 Manhole Frames and Covers

Frames and covers are to be Gray Iron Castings, Type A-1497 as manufactured by Alhambra Foundry Co. Ltd. or approved equal. Castings for manhole frames and covers shall conform to ASTM A 48, Class 30. Frame and cover shall be machined to fit. Lids shall be imprinted with the words "Clark County Public Works Storm Drain".

2.1.13 Steel Chain Gate

Chain safety gate shall be manufactured from 6 mm diameter carbon steel coil in accordance with ASTM A 467/A 467M.

2.1.14 Steel Gratings

Steel gratings shall be fabricated of steel conforming to ASTM A 36/A 36M per dimensions shown on drawings. Galvanizing shall conform to paragraph ZINC COATING.

2.1.15 Stilling Well Ladder and Safety Cage

Ladder and cage shall be detailed and submitted for approval prior to fabrication. Full dimensions, wall and floor attachments, materials, construction and finish must be shown. All edges shall be clean, smooth, burr-free and rounded.

a. Rungs shall be no less than 31.7 mm in section and 466.7 mm long, formed from tubular aluminum extrusions, alloy 6063-T6 or 6005-T5, shall be squared and deeply serrated on all sides, and shall be at 305 mm intervals. Rungs shall be able to withstand a 450 kg load without failure.

b. Side rails shall be aluminum channel no less than 3.2 mm wall thickness by 76.2 mm wide.

c. Safety cage shall be fabricated from 4.8 mm by 50.8 mm aluminum bar, alloy 6063-T5 or 6005-T5. Cage hoops shall have 342.9 mm minimum radius. Safety cage shall end a minimm of 2.13 meters and a maximum of 2.44 meters above the bottom of the ladder.

d. Platform shall be provided at maximum interval of 9.144 meters with deck of serrated aluminum treads.

e. Wall mounting brackets shall be aluminum no less than 50.8 mm by 4.76 mm.

f. Floor mounting brackets shall be aluminum, angle, no less than 101.6 mm by 50.8 mm by 4.76 mm.

PART 3 EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

All items shall be installed at the locations shown and according to the manufacturer's recommendations. Items listed below require additional procedures as specified. Items installed in roads under jurisdiction of the State of Nevada Department of Transportation shall be in accordance with NDOT requirements.

3.1.1 WORKMANSHIP

Miscellaneous metalwork shall be well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching shall produce clean true lines and surfaces. Welding shall be continuous along the entire area of contact except where tack welding is permitted. Steel with welds will not be accepted, except where welding is definitely specified or called for on the drawings. All bolts, nuts, and screws shall be tight. Work shall be accurately set to established lines and elevations and securely fastened in place. Anchorage shall be provided where necessary for fastening miscellaneous metal and wood items securely in place. Anchorage not otherwise specified or indicated shall include slotted inserts made to engage with the anchors, expansion shields, and power-driven fasteners when approved for concrete; machine and carriage bolts for steel; and lag bolts and screws for wood.

3.2 FINISHING

In general, tolerances for machine-finished surfaces designated by nondeciaml dimensions shall be within 0.4 mm. Sufficient machining stock shall be allowed on placing pads to insure true surfaces of solid material. Finished contacts of bearing surfaces shall be true and exact to secure full contact. All drilled holes for bolts shall be accurately located and drilled from templates.

3.3 ZINC COATING (GALVANIZING)

Zinc coatings shall be applied in a manner and of a thickness and quality conforming to ASTM A 123/A 123M. All exposed ferrous metalwork, except cast-iron and corrosion resistant steel and items to be completely embedded in concrete, shall be galvanized unless other protective coatings are specified. Metalwork shall be galvanized after fabrication. In the event that any portion of galvanized metalwork is abraded or otherwise damaged to the extent that the base metal is exposed, such damaged or abraded portions

shall be neatly covered with Grade 50B solder conforming to the requirements of ASTM B 32.

3.4 WELDING

Welding shall conform to the provisions of AWS D1.1. Welders who have not been certified within two years of the date of commencement of work under this contract will not be allowed to perform the work.

3.5 BOLTED CONNECTIONS

Bolt holes shall be reamed normal to the member and shall be truly cylindrical throughout. Unless otherwise specified, holes for bolts shall not be more than 1.60 mm larger than the diameter of the bolt. Cutting bolt holes with a torch will not be permitted without the prior written approval of the Contracting Officer. Materials and parts necessary to complete each item, even though such work is not definitely shown or specified, shall be included. Poor matching of holes for fasteners shall be cause for rejection. Fastenings shall be concealed where practicable.

3.6 EXCAVATION

Excavation for concrete-embedded items shall be of the dimensions indicated on the drawings. Holes shall be cleared of loose materials prior to placement of concrete.

3.7 SEDIMENT STAFF GAGES AND PIPE BOLLARDS

Sediment staff gages and pipe bollards shall be fabricated with heavy duty steel pipe conforming to ASTM A 53/A 53M, Type E or S, weight STD, galvanized after fabrication as shown on the drawings. Sediment staff gages and pipe bollards shall be set vertically in concrete encasements. Concrete for encasements and pipe fill where indicated shall be as specified in SECTION 03301 CAST-IN-PLACE STRUCTURAL CONCRETE FOR CIVIL WORKS having a compressive strength of 21 MPa.

3.8 PAINTING

Painting of sediment staff gages, basin depth gage, and pipe bollards shall be in accordance with the requirements of the DPWCC, UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA, SECTIONS 614 AND SECTION 714.

3.9 STILLING WELLS

3.9.1 Steel Cover Plates and Frames

Steel cover plates and frames shall be of the type and size specified or shown on the drawings and shall be fabricated to accurately fit the supporting member. Openings shall be provided as shown on the drawings or as required. Steel cover plates and frames shall be galvanized after fabrication.

3.9.2 Ladder and Safety Cage

Ladder and safety cage shall be installed per manufacturer's recommendations.

3.10 PIPE ACCESS GATE

Pipe access gates that restrict vehicle access into the channel invert shall be installed at the top of each of the invert access ramps. Locations of the invert access ramps are indicated on the drawings. Pipe access gates shall be fabricated in the shop from standard weight steel pipe conforming to ASTM A 53/A 53M. All pipe access gate components shall be galvanized after fabrication. Welded, cut, damaged, and deformed areas of galvanizing metal shall be neatly coated with Grade 50B solder conforming to ASTM B 32. The pipe access gates shall be installed in such a fashion that they work freely. The Contractor shall examine the operation of all pipe access gates not sooner than 30 days after installation for ease of operation. Any pipe access gates that cannot be operated by one person will be repaired (including any required structural modifications) by the Contractor at no additional cost to the Government, and requirements for repair shall conform to the requirement for installation above.

3.11 Steel Sleeves

Steel sleeves for utilities shall be placed to the alignment and grades indicated and in accordance with SECTION 02317 UTILITY SYSTEMS - GENERAL, and in accordance with SECTION 02316 EXCAVATION, TRENCHING AND BACKFILLING FOR UTILITIES SYSTEMS, and in accordance with the drawings.

-- End of Section --